Sustainable Utilization of Water Resource in China

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Mr. Chairman,
Experts and Professors,
Ladies and Gentlemen:

Water is a non-fungible resource for human existence and development. China is a country with the frequent flood and drought disasters and the shortage of water resource, and water issue is vital important for the country. Since the founding of the People's Republic of China, our government has exercised the leadership of the people of the whole country to construct water conservancy works on a large scale and has gained great achievements. However, water-related problems are still hindering the Chinese economic and social development. The sustainable utilization of water resource is the key problem for the economic and social development in China. Now let me make a brief introduction to the sustainable utilization of water resource in China.

1. General situation of water resource in China

In China, the total amount of water resource is plentiful, which is 2800 billion m^3. The rainfall season is basically synchronous with the hot season. The good natural environment has created favorable conditions for the existence and development of the Chinese nation. But the amount of water resource per capita in China is only 2300 m^3, which is 1/4 of that of the world. In addition, the uneven spatial and temporal distribution of the precipitation makes the country become one with frequent occurrence of flood and drought disasters.

Influenced by the natural conditions and the monsoon climate, the distribution of the precipitation in China is very uneven in a year and among years. About 70% of the total annual precipitation are mainly concentrated in flood season, that is to say, about 2/3 of the total amount of water resource are flood runoff, which always causes flood disasters during flood season. Especially, the regions in the middle and lower reaches of large rivers have

more than one half of the country's total population, one-third of the total cultivated land and seventy percent of the gross national product. It is the place of the country's cream. However, the most of the ground elevation in such regions is under the flood level of river, so that the potential flood disaster always threatens the economic construction and the normal life of the people.

The catchment area of water system to the north of the Yangtze River basin accounts for 63.5% of the country's territory, but its total amount of water resource is only 19% of the country's total. The area of the regions in the inland rivers in the northwest of China accounts for 35.3% of the country's territory and its total amount of water resource is only 4.6% of the country's total. In three river basins of the Yellow, the Huaihe and the Haihe in the north of China, the amount of water resource per capita is 1/4 of that of the world. The drought and the water shortage have become main natural disasters in China, especially in the north part of China.

Since the founding of the People's Republic of China 50 years ago, the water conservancy in China has gained rapid development. Up to the year of 1998, the length of dykes in the whole country had been increased from 20 thousand km to 250 thousand km. The reservoirs in China had been increased from more than 20 to 84000, with the total storage capacity of more than 460 billion cubic meters. These reservoirs have preliminarily controlled the ordinary flood and guaranteed the safety of more than 600 cities, 33 million ha. of cultivated land and the main railway and transportation artery. More than 4.60 million water storage, diversion and pumping and water supply works have been constructed in the whole country. The annual water supply capacity of various water facilities is up to 560 billion cubic meters. The exploitation and utilization rate of water resource is up to 20%. The irrigated farmland area has been developed from 16 million ha in 1949 to more than 53 million ha at present. Although the irrigated land is less than 2/5 of the country's total cultivated land, it yields 3/4 of the country's total grain and 4/5 of the country's total cash crop, which enables China to support 22 percent of the world's total population only with less than 10 percent of the world's total farmland. The total installed capacity of hydropower in the whole country has increased from 360 MW in 1949 to 64000 MW at present. More than 300 counties(cities) mainly relying on hydropower have realized preliminary rural electrification and about 300 million people rely on small hydropower

stations to supply electricity. The area of soil erosion of 740 thousand km^2 has been preliminarily disposed. The total area of the terraced field, the valley flatland and the farmland formed by disposed sediment of 18.0 million ha has been completed. The diversified cash fruit trees and the forest for soil and water conservation of 40 million ha have been planted.

2. The 1998 flood in China

The 1998 heavy flood in China had attracted great attention of all countries in the world and the international society. Because of El Nino influence to the climate in China in 1998, the Yangtze River occurred the flood ranked second in the whole basin in this century. The Songhua River and Nenjiang River in the Northeast China and the Minjiang River in Fujian Province occurred the largest flood in this century. The Xijiang River in the Pearl River basin also occurred the second large flood in this century. Under the strong leadership of the central government and the support from the people all over the country, more than 300 thousand soldiers from the Chinese People's Liberation Army and the Chinese People's Armed Police and several million cadres and masses displayed their indomitable and desperate spirit to fight against floods which exceed the designed flood control criteria. They had treated more than 15 thousand dangerous places. Although the breach in the Jiujiang section of the dyke of Yangtze River happened, it was blocked successfully within five days, which guarantees the safety of main river dykes, important cities, main transportation artery and the life and properties of the people in the region. It also reduced the losses caused by the flood and waterlogging disasters to a minimum. Therefore, the whole victory of fighting against flood disasters had been gained.

According to the statistics from various provinces, in 1998, 13.78 million ha of farmland was hit by flood and waterlogged disasters in the whole country, with the death of 4150 people and the direct economic losses of over 30.0 billion US dollars. However, compared with the similar flood years in the history, the losses of the flood disaster in 1998 was much less. For example, the large flood happened in the Yangtze River in 1998 is similar with that in 1931 and in 1954, which all happened in the whole river basin. The heavy flood of the Yangtze River inundated an area of 3.17 million ha in 1954 but only 0.32 million ha in 1998. The large flood of the Yangtze River killed 145000 people in 1931 and 33000 people

in 1954, but only 1562 people in 1998. Moreover, flash flood and mud-rock flow in mountainous regions cause most of deaths in 1998.

When the flood in 1998 was just receded, the Chinese government immediately allocated special funds for the rescue arrangement, the anti-epidemic measures, the agricultural re-production and the home rehabilitation for the affected farmers. The goal is to enable them to have food, clothes and houses and avoid big epidemic diseases after flood disasters. In addition, the overall arrangement for rehabilitation after flood disaster, river and lake training works and water conservancy construction has been conducted. In last year, the water conservancy construction investment was increased by 3.0 billion US dollars. At present the training work of rivers and lakes has still being undertaken.

3. Focus points of water-related problems in China in the 21st century

(1) Flood and waterlogging disasters

The flood control system of large rivers in China is composed of dykes, reservoir, flood-storage and detention basins. At present, the major problem is that the flood control standards for large rivers are on the low side. It could only fight against the 10-20 years flood. If combining with the use of flood-storage and detention basins, it can only fight against the 20-50 years flood. For those medium and small rivers, their dykes only could fight against the 5-10 years flood. With the increase of population, the rapid economic development and the aggradation of river channels and lakes, the problems of flood control will be more and more outstanding.

(2) Shortage of water resource

The agriculture in China is of the irrigation type. At present, the area of drought-hit farmland in the whole country is up to over 26.60 million ha annually. Among the irrigated farmland of more than 53.0 million ha in China, the annual water shortage volume is about 30.0 billion cubic meters. There are 76.0 million ha of cultivated land without irrigation facilities. Among 670 cities in the whole country, there are more than 400 cities with the shortage of water to the different extent. By the middle period of next century, the population in China will be up to 1.6 billion and the irrigation area will be developed to over 60 million ha. In addition, the urbanization rate of population in China will be

increased from 28.7% at present to about 56% and the Chinese economy will reach the level of that of the medium-developed countries in the world. The supply of water will become the key constrain factor for economic development in the whole country.

(3) Pollution of water body

At present, the total discharge of the industrial and urban wastewater all over the country is 58.4 billion tons, and among them, only 23% have been concentratively treated to reach the stipulated discharge standard, the reuse rate of treated wastewater is much lower. In one half of the country's total monitored river length, their water quality cannot meet the requirements of drinking water standard. More than 90% of water body in cities all over the country are polluted to the different extent. With the increase of population and the development of economy, cities and towns, the pollution of water body will be more and more serious.

(4) Worsening of water ecosystems

At present, the area of water and soil erosion in China is 3.67 million square kilometers, accounting for 38% of the country's total territory, which makes the aggradation of rivers, lakes and reservoirs increasingly serious. The dry up of the rivers in the north region of China is more and more serious. For 26 years from 1972 to 1998, there are 20 years that the dry up flow of the Yellow River had occurred. Especially since 1990, such situation occurs every year. The average occurrence period of dry up flow annually in Yellow River is 107 days. In addition, there still exist the problems of lake shrink, forest devastation, grassland degradation, land desertification, wetland dry, secondary salinization in irrigated area, and groundwater overdraft in some regions. All these problems cause the worsening of environment and the unbalance of ecology conditions in some regions.

4. Countermeasures for solving the water resource problems in China

The Chinese government has paid great attention to the sustainable utilization of water resource. In view of the coordinated arrangement of population, resources, environment and economic development, the government has formulated the principles of "overall planing, full-angle consideration, all-round treatment, integrated development". Meanwhile, the Government also carried out the policies of water conservancy construction of " the

combination of benefit generation with disaster abolishment, the equal stress on saving water and opening up new water source, and the simultaneously adoption of flood control and drought prevention". The construction of water conservancy and ecosystems has been developed in the whole country.

(1) Construction of the ecosystems

The principle of closing hillside to plant trees and returning cultivated land to forest should be carried out in order to control the water and soil erosion and improve ecosystems. The lumbering of natural forests in the upper and middle reaches of Yangtze River and Yellow River shall be forbidden. The afforestation project will be carried out in those regions with the serious worsening of ecosystems in Yangtze River and Yellow River basins in next 20-30 years in order to increase the forest cover percentage in such regions. The area of grassland and vegetation should be enlarged and restored. The comprehensive treatment of small watershed should be developed and the project of transforming hillside field into terrace land should be carried out in order to control soil and water erosion.

(2) Integrated treatment of rivers and lakes

The policies of "combining flood storage and releasing, and taking flood releasing first" in large rivers and lakes should be carried out. It is planned for the Yangtze River to take ten years to set up a flood control system of combining engineering and non-engineering measures in order to fight against the maximum flood which had happened since last half of the century. These engineering measures consist of taking dykes as its base, the Three Gorges Project as its backbone, and other measures of the reservoirs in main streams and tributaries, flood storage and detention basins, river training, polder removal for releasing flood, returning farmland at lake side to lake, soil and water conservation and afforestation. In addition, new plans of river harnessing are also formulated for the Yellow River, Songhua River, Nenjiang River, Huaihe River and other large rivers and lakes.

(3) The rational utilization and protection of water resource

The development and utilization of water resource should be insisted on the policy of simultaneous adoption of opening up new water sources, saving water and protecting water resource and the principle of adapting economic and social development to water resource conditions. At present, on the one hand, our country is short of water resource and on the

other hand the waste of water resource is very serious. The efficient utilization coefficient of agricultural irrigation water in China is only up to 0.4. Therefore, the saving water potential is great. The close attention should be paid to water saving and water saving taken as a basic measure. The water saving irrigation should be greatly popularized. Water saving should be taken as core for the rehabilitation of the old irrigation systems. All these will provide China with the favorable conditions to realize the basic self-sufficient in food grain in the 21st century.

The industrial and domestic water users will be new large users, which will greatly increase water consumption in future. They should be in accordance with the requirements of saving water and reducing pollution. The Chinese Government has paid close attention to the treatment of water pollution. The treatment of "three rivers and three lakes" (Huaihe River, Haihe River, Liaohe River, Taihu Lake, Chaohu Lake and Dianchi Lake) has gained the initial success. The construction of municipal sewage plant has been speeded up in different regions of China. The protection and management of water sources should be strengthened. The water quality monitoring and water pollution control in river basins should be enhanced. The reuse rate of the treated wastewater should be raised and the wastewater made as a resource.

To solve the water shortage in North China and the dry up of Yellow River should be based on energetically developing water saving and making full and rational use of local water resource, and the overall consideration taken on the rational deployment of water resource of four large river basins (Yangtze River, Huaihe River, Yellow River and Haihe River). Meanwhile, the south-to-north water transfer project should be constructed in good time.

In the 21st century, the conditions of water resource should be fully considered on economic and social development and the productive force arrangement in China. In the regions with the shortage of water, it is necessary to limit the crops and industrial projects with large water consumption. In the coastal areas, the use of seawater should be fully taken into account.

(4) Increasing the investment of water conservancy construction

The key of strengthening the construction of water conservancy infrastructure is to increase

the input of water conservancy construction. In recent years, the Chinese government has greatly increased the construction investment of water conservancy and ecosystems. The central financial allocation of about 4.0 billion US dollars for water conservancy construction in 1998 fiscal year had been made and the local governments at different levels had also increased the input for water conservancy construction. With the increase of water conservancy construction tasks, it is necessary to set up and perfect the input system of water conservancy adapting the socialist market economy and a mechanism that the state supports farmers to conduct farmland water conservancy construction.

(5) Strengthening the management of water resource

Our government has paid close attention to the legislative construction. The following laws and regulations have been formulated and come into effect: " Water Law of the People's Republic of China", "Soil and Water Conservation Law of the People's Republic of China", " Flood Control Law of the People's Republic of China", and "Water Pollution Control Law of the People's Republic of China". In addition, it is planned to draw up "Water Saving Law of the People's Republic of China", "Watershed Management Law of the People's Republic of China", " Water resource Management Law of the People's Republic of China", and "Management Regulations of Flood Storage and Detention Basins in China". It is to strengthen the unified management of water resource and adopt the management method of taking the river basin as a unit. The system of water use license should be carried out to promote completely the water demand management. It should also strengthen and perfect the enforcement supervisory system of water administration and strengthen the enforcement supervision work of water resource management.

(6) Depending on the advancement of science and technology and strengthening the international cooperation

In the river harnessing and water conservancy construction, it is necessary to widely apply new technologies. The key problems of river harnessing, optimal allocation of water resource, water saving, and wastewater treatment should be verified in the scientific way. The international exchange and cooperation should be widely developed in the following areas: the river training and the management of flood storage and detention basins, the water-saving irrigation and the irrigation district rehabilitation, the wastewater treatment and reuse and the sea water utilization, the water resource management and watershed

management, the policies of water conservancy investment and water economy, the sustainable utilization of water resource and the economic construction, and the key large scale water resource project.

Water resource issue is the focus point in the 21st century and also the common concern between the United States of America and the People's Republic of China. I believe that this symposium on water resource jointly organized by our two countries will play an important role in promoting the cooperation of water resource development between the two countries and realizing the sustainable utilization of water resource. I extend my cordial congratulations to the smooth opening of this symposium and wish it a complete success.

Thank you!